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ABSTRACT

The dissemination of successful educational innovations has long been a strongly supported policy in educational settings. Recent research developments have led to a debate as to the appropriateness of a centralized versus decentralized dissemination policy. The current research provided a test of the modified Research, Development and Diffusion (RD&D) model of innovation dissemination. Results clearly support the notion that a modified RD&D model is indeed feasible as a means of bringing about large scale educational change. Well specified programs were adopted and implemented within conservation developer-defined acceptable bounds of fidelity. The significance of the fidelity of implementation was addressed through its relationship with the degree to which the model program was reinvented at the local adopting site, the extent to which the program has become routinized at the local site and the effectiveness of the implementation at the local site. Policy implications were discussed. (Author)

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The Implementation of Disseminated Educational Innovations: Is the Modified RD&D Model Viable?

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Abstract

The dissemination of successful educational innovations has long been a strongly supported policy in educational settings. Recent research developments have led to a debate as to the appropriateness of a centralized versus decentralized dissemination policy. The current research provided a test of the modified Research, Development and Diffusion (RD&D) model of innovation dissemination. Results clearly support the notion that a modified RD&D model is indeed feasible as a means of bringing about large scale educational change. Well specified programs were adopted and implemented within conservation developer-defined acceptable bounds of fidelity. The significance of the fidelity of implementation was addressed through its relationship with the degree to which the model program was reinvented at the local adopting site, the extent to which the program has become routinized at the local site and the effectiveness of the implementation at the local site. Policy implications were discussed.

The Modified RD&D Model

Over the past 20 years, a growing proportion of social scientists' research efforts and government spending has gone to the solution of social problems through the development and dissemination of social technologies and innovations (Williams, 1976). In much the same fashion as the "Sputnik Strategy", the basic approach involved the widespread use of the Research, Development, and Diffusion (RD&D) model (Yin, 1978a). Examples of this approach can be found in most areas of societal concern. The ideal model for this process has a great deal of logical appeal. First, innovative technology is developed in response to a social need or problem. Then, the prototype technology is implemented and tested for its effectiveness in alleviating or fulfilling the need. If the evaluation of the technology indicates that it is successful (better than existing practice in terms of the relevant criteria), information about the innovation is then disseminated to appropriate individuals and organizations (e.g., school systems). The process comes full circle when those receiving the information then adopt the technology, theoretically improving the general social situation.

This approach has basically assumed the "build a better mouse-trap" perspective of change. Organizations which might potentially adopt innovations were viewed as ready, willing, and able to adopt innovations which were demonstrated to be effective ("validated"). In general, these organizations are viewed as being passive receivers in the dissemination and adoption phase. Furthermore, not only was

adoption assumed to automatically follow from dissemination, but implementation was viewed as a relatively automatic result of adoption.

Research in the last five to ten years has cast considerable doubt on the validity of these assumptions (Berman & McLaughlin, 1978; Farrar, deSanctis, & Cohen, 1979; Fullan & Pomfret, 1977; House, 1975; House, 1981). These studies have concluded that any description of the use of innovations by organizations must take into account not only the characteristics of the innovation as it was disseminated, but also a number of characteristics of the organization and the processes by which the innovation is adopted, implemented, and routinized. Researchers interested in program effectiveness have also cast doubt on the assumptions of the model by demonstrating that the degree of effectiveness of the program is often critically influenced by the degree of program implementation (Boruch & Gomez, 1977; Charters & Pellegrin, 1973; Fullan & Pomfret, 1977; Hall & Loucks, 1977).

Recognition of the role of the adopting organization led to what might be labeled the "modified" RD&D approach. (A similar view was expressed by Havelock (1976) as the "linkage" model.) Instead of assuming that potential users were passive and eager in their approach to innovation, the modified RD&D approach encouraged a more active stance involving both the disseminator and potential user of an innovation, and recognized organizationally-based resistance to change. One of the most visible users of the modified RD&D approach has been the Department of Education through the

National Diffusion Network. This network was designed to utilize state facilitators as active change agents to assess the needs of local districts, to tailor change strategies to the district's political climate, and to foster local support for the disseminated innovations (Emrick, Peterson, & Agarwala-Rogers, 1977).

At the core of the study of the RD&D approach are the concepts of fidelity, adaptation, reinvention, routinization and program effectiveness. Fidelity, adaptation and reinvention all relate to the degree to which an innovation as implemented is similar to the innovation which was disseminated. A minor war has been fought in the literature concerning the desirability of such similarity (Berman & McLaughlin, 1978; Datta, 1981). Those arguing in favor of fidelity with minimal reinvention (or change) argue that innovations are validated and evaluated as a whole. They hold that evaluation research rarely allows for an examination of the relative importance of individual components of an innovation or program. Tinkering with this black box is likely to modify not only the characteristics of the innovation, but also its degree of effectiveness.

On the other hand, proponents of the adaptation position have argued that local adopters of the innovation have a greater understanding of organizational, political, social, and economic factors which relate to the use of the innovation. These differing organizational contexts and imperatives result in a need to incorporate these factors into the implementation of the innovation.

Although at first glance the concept of reinvention may appear to be synonomous with adaptation, some discussion in the literature

suggests the utility of defining the two terms as distinct concepts. The concept of reinvention first appeared in the literature with Eveland, Rogers, and Klepper's (1977) analysis of the implementation of a public policy innovation. It has since been discussed by Larsen and Agarwala-Rogers (1977), Rogers (1978), and Rice and Rogers (1981). These authors have used the term to highlight the process by which an organization attempts to claim "ownership" of an innovation.

The authors of this paper have suggested several alternative definitions for the term reinvention, each of which distinguishes the concept from both adaptation and lack of fidelity (Roitman & Mayer, 1982). Summarizing this discussion, it appears that an empirically based definition of reinvention such as "changes in the program that cannot be accommodated within developer-defined component frameworks" has utility. This conceptualization enables analyses of both fidelity-based and non-fidelity-based changes in programs.

A concept that is very much related to implementation is routinization, defined as the process whereby a program becomes part of the standard operating procedure of an agency (Yin, 1978b). If the program is successful, it is imperative for the sake of both the general social welfare and the effectiveness of the organization that the program survive over time. Yin conceives of routinization as consisting of a series of 10 passages and cycles. The more passages and cycles that a program has gone through, the more routinized that program has become.

On both a practical and theoretical level, routinization should have some interesting relationships with fidelity and reinvention.

For instance, it is possible that a high fidelity program would become more routinized and ultimately survive because program staff can point to other programs and say "we did it just like they did". Alternatively, a program that has been modified to fit the organization could potentially become more routinized since it causes less problems for the organization, is accepted more by organizational staff and decision makers, and has less of the "not invented here" syndrome that is associated with high fidelity programs (Eveland et. al., 1977). A third possibility would be that there is some optimal level of fidelity and reinvention that a program should posess in order to maximize both its effectiveness and the chances that the program will survive over time.

A final concept which must be considered in a discussion of the RD&D approach is innovation effectiveness. As noted above, the RD&D model assumes that programs which have been systematically developed and evaluated will achieve levels of outcome effectiveness at adopting sites equivalent or similar to those achieved at developer sites. Although some research exists to support this assumption (Roitman, Blakely, Gottschalk, & Mayer, 1983), few empirical examinations of this assumption have been completed (Scheirer & Rezmovic, 1982). Thus, an adequate examination of the RD&D approach requires including program effectiveness as a variable and testing its relationships with fidelity, reinvention, and routinization.

METHOD

In order to provide an adequate test of the modified RD&D model it was necessary to identify innovations that had been subjected to rigorous scientific evaluation procedures and disseminated through some active process in some well-specified concrete form. The National Diffusion Network (NDN) of the Department of Education provided a suitable source of nationally disseminated innovative programs. Disseminated materials were reviewed and ultimately three NDN innovations were identified that met selection criteria.

Potential implementers of the innovative programs were identified through developer contact records. Initial information gathering steps were conducted via phone contact, and arrangements were made to site visit thirty schools (10 per innovation). Table 1 contains a description of the seven programs that were selected for study.

Measurement Development

Several instruments were developed to monitor the modified RD&D process and its impact on the specific manner with which organizations were implementing the innovative program models. As mentioned above, the major dimensions of interest were the fidelity with which the innovations were implemented, the degree to which the organization reinvented or modified the model, the effectiveness of the innovation at the implementing site, and the extent to which the program had become standard practice within the adopting organization (routinization).

Degree of Implementation

Fidelity was assessed by utilizing a modified version of the Hall and Loucks model (1978). Briefly summarizing this process, two members of the research team visited each program developers' site. Extensive interviews with developers and staff were audio-recorded. All available materials and tapes were then independently content-analyzed by several staff members in an attempt to identify all potential components of the innovative program. Components were required to conform to the following criteria. (1) Components should identify observable activities, materials or facilities. If not observable, the implementation of the component should be verifiable through some other means. (2) Components should be logically discrete and whenever possible should not be dependent upon the implementation of other components. (3) Components should be relatively innovation specific. That is, procedures which are part of other programs or standard practices should not be considered innovation components. (4) The list of components should exhaustively describe the innovation. An example of part of a fidelity measure can be found in Appendix 1.

However, fidelity was not assessed merely as the number of components implemented at each site. Rather, component variations of ideal, acceptable or unacceptable were generated by the researchers. These variations were then fed back to the program developers and modified accordingly. Thus, fidelity scores represented the extent of component variation as well as the degree to which the implementation mirrored the original model.

In a recent comprehensive review of the innovation implementation

literature, Scheirer & Rezmovic (1982) reported that far too little attention has been paid to the psychometric quality of implementation instruments. Consequently, this research paid special attention to instrument quality. For example, inter-rater reliability calculations were computed at nearly 20% of the sites. During these checks each researcher observed the same activities, interviewed the same respondents and examined the same documents. Inter-rater exact agreement figures were .81. In addition convergence of sources (validity) was determined. Data from multiple sources was gathered at every site. Research staff then determined the best response for each data point through the assimiliation of all available data sources. Agreement figures between multiple data sources and the respective final rating were calculated. The overall percent exact agreement figure was .96. Thus, the fidelity instrument was demonstrated to have excellent reliability and validity properties.

Reinvention

It has been suggested that organizations do not adopt blueprints of innovations. Rather, they adopt general concepts and adapt the specifics to meet their local needs and interests (Rogers, 1978). Consequently, reinvention was assessed at each site as well. The researchers paid constant attention to activities, materials, and facilities that did not fit within the framework of the innovation components and/or their variations. Immediately following each site visit, staff tape-recorded comments pertaining to potential instances of reinvention as they occured at each site. Following the entire data collection phase, transcripts were content analyzed. The result was a two dimen-

sional view of reinvention (see Figure 1). An instance of reinvention could be categorized as an addition to existing components (beyond the bounds of identified components) or a modification of existing components (within the bounds of existing components but beyond the specified variations). On the other dimension, instances of reinvention could be categorized as proactive attempts to change the model or reactive changes brought on by some existing constraints either internal or external to the organization (e,g., political or economic demands). Finally, the extent of the reirvention was assessed on a three point scale (i.e., minor, moderate, major). Again, reliability was calculated by determining the percentage of exact agreement between ratings of staff pairs. The figures for each of the two dimensions and the extent rating were all in the .70 - .90 range.

Routinization

Routinization has been characterized best by Yin (1978b) who outlined ten passages and cycles which a program must survive in order to become standard practice in the adopting organization (see Table 2) Various items were generated that related to the passages and cycles described by Yin that pertained to the types of organizations included in the final sample. A reliability strategy similar to that used with the fidelity instrument was carried out. Exact agreement between ratings was .86.

Effectiveness

Outcome effectiveness was assessed by attempting to gather information identical to the data used to evaluate the initial innovation prior to dissemination ("validation"). In other words, at each site,

every attempt was made to gather pre and post effectiveness data (e.g., nationally norm referenced test scores, attendance figures, career attitudes, school achievement data, etc.). Data was available on 65 of the 70 sites visited. In order to take into account the variability of data available at various sites, effectiveness scores were rankordered within innovation. An overall rank-order correlation of .90 was obtained between rater pairs, attesting to the reliability of this procedure.

Overall, the application of these methods demonstrated the feasibility of assessing fidelity, reinvention, routinization, and effectiveness with a relatively high degree of reliability and validity. The validity of this data was further enhanced due to the fact that it was collected on site, and thus it was possible to compare alternative sources of information concerning a given item.

Results

First, we examined the fidelity scores for the three programs in order to determine if the modified RD&D approach employed by the NDN resulted in high fidelity programs. Figure 2 depicts the frequency distributions of the raw fidelity average item scores. Note that most HOSTS and EBCE replicates clearly fell above the acceptable range, whereas many FOCUS replicates fell between acceptable and unacceptable (0=unacceptable, 1=acceptable, 2=ideal). However, in general, it can be concluded that the NDN's dissemination activities resulted in programs implemented with at least acceptable levels of fidelity, as none of the program fidelity means were significantly different than one (developer defined acceptable). It should also

be noted that these developer defined criteria, due to the developer's perceived sense of ownership of the original model, were conservative estimates of the program's fidelity.

An analysis of variance revealed that these differences among mean program fidelity scores were significant ($p<.05$). A Scheffe post-hoc procedure was used to determine which program differences were responsible for the overall significant F value. This analysis revealed that while the difference between HOSTS and EBCE was not significant; the differences between HOSTS and FOCUS as well as between EBCE and FOCUS were significant. One might speculate these differences were due to (1) the less well-specified nature of program components in FOCUS as compared to HOSTS and EBCE, (2) the fact that FOCUS targets students with academic and behavioral problems, thus making implementation more problematic, and (3) funding sources for FOCUS were variable, whereas funding for HOSTS and EBCE had clearer precedents and were more specifically targeted (e.g., Title I and Vocational Education funds).

These results must be qualified by the fact that the use of analysis of variance in this situation rests on the following assumptions: (1) the fidelity metric is an interval-level scale, and (2) that the fidelity score for one program is measured on the same scale as that of another program. Since the three programs are implemented in different organizational contexts (e.g., elementary schools, high schools, alternative schools, etc.), and since the fidelity measure is to some extent program-specific (e.g., the number of components per program varies), one might argue that three different measures are

actually employed. However, this can be viewed as a conservative position; a more liberal view would hold that since identical procedures were used for the development of each program's component set and the fidelity measures are fairly comparable across programs. However, the fact remains that program fidelity means were not significantly different than developer defined acceptable levels. Program differences are probably related to program specifics; the point being that implications and policy decisions made while generalizing across programs should be done with appropriate caution.

Table 3 presents the correlations among fidelity, reinvention, program effectiveness and routinization. All of these correlations are based on a sample of 28-30 organizations. Reliabilities of the measures are presented in the diagonals.

One of the major research questions addressed the relationship between fidelity and program effectiveness. Pro-fidelity proponents have argued that low fidelity will dilute program effectiveness, whereas pro-adaptation proponents have argued that this will not necessarily be the case. The significant correlation between fidelity and effectiveness suggested that higher fidelity programs did result in more effective programs. When corrected for attenuation the fidelity-effectiveness relationship was inflated to .4588. The policy implication is that dissemination vehicles should attempt to ensure high fidelity implementation in order to facilitate effective programs.

Positive and significant correlations also existed among fidelity and reinvention as well as among reinvention and program effectiveness.

Although a positive fidelity-reinvention relationship may seem counter-intuitive, it should be considered in light of the conceptualization and measurement scheme that was employed. Reinvention included changes in the program that did not necessarily imply lack of fidelity. Approximately 60% of the reinvention instances reflected additions to the program, rather than modifications of the developer prescribed components. The broad picture that emerges suggests that some organizations put a great deal of effort into implementing the model with fidelity, improving upon the model although leaving what is prescribed intact, and that both these efforts lead to program effectiveness. When corrected for attenuation these relationships were even stronger: the fidelity-reinvention relationship became .4773 and the reinvention-outcome relationship became .5479. It should be noted that the reinvention-outcome relationship is slightly stronger than the fidelity-outcome relationship, thus lending some support to the pro-adaptation position.

Routinization proved to be a difficult concept to operationalize. Initially, the measure that was developed was based upon Yin's (1978b) passages and cycles. Items that reflected each of the passages and cycles were written. In some cases multiple items corresponded to a particular passage or cycle; in others a passage or cycle was measured by one item. In some cases the data collection process called for review of archival documents; for other items the data was collected by interviews with one or many respondents. Our efforts to develop internally consistent routinization subscales did not lead to much success. These problems were compounded by the fact that no

well-recognized criterion variables exists for routinization (Mohr, 1978). Thus, our measurement strategy relied on trying alternative measurements of the same concept.

The first measurement strategy was based on the premise that the passages and cycles are independent phenomena, that is, a program may have survived some subset of them, but this does not necessarily imply that the program would survive the remaining passages and cycles. Thus, our analysis strategy, in this case, rested upon a dichotomous coding scheme which reflected whether or not a particular passage or cycle had been survived by the program. The total measure was a sum of the passages and cycles survived. And, indeed, this summative conceptualization also asserts that the passages and cycles are independent. Therefore, it makes sense that the routinization variables did not highly intercorrelate and form an internally consistent scale. Furthermore, each program was adopted and implemented at different times. It may have been the case that differing organizational contexts imposed different levels of difficulty upon achievement of a given passage or cycle. That is, it may take longer to achieve a given passage or cycle in one organization than in another.

The other two measurement attempts at routinization reflected our search for an appropriate criterion. The first was a two-item measure which asked actors from various levels in the organizational hierarchy the likelihood that the program would still exist in two years and five years. The internal consistency of this 2-item measure was .82. Organizational scores were computed by aggregating across

individual responses. The second routinization criterion was the age the age program in the organization.

Unfortunately, there was little concurrence among these measures. The correlations among the dichotomous measure, the perceived measure, and age were very close to zero. The correlation between age of the program and the perceived measure (i.e., 2 or five year likelihood) was .29 ($p=.059$, $n=30$). Thus, there seemed to be little agreement among these alternative measures.

Turning again to Table 3, it appears that both perceived and passage and cycle based (i.e., dichotomous) routinization measures are not related to fidelity, reinvention or effectiveness. The strongest relationshp existed between perceived routinization and program effectiveness, although this correlation did not approach significance. Age was not included because it does not directly imply a routinized program (Yin, 1978b).

However, there were some interesting findings concerning routinization and several other variables that were measured. First, perceived routinization and age were significantly and positively related to teachers', aides', and principals' involvement in the adoption decision, the early implementation of the program and the implementation of training procedures for the innovative program. This suggests that cross-level participation in the beginning stages of a program's implementation can lead to perceived routinization. Furthermore, teacher and aide involvement was positively related to teacher job satisfaction as measured by the Minnesota Satisfaction Questionaire (Weiss, Dawis, England, & Lofquist, 1967). Second, district-level sup-

port was significantly and positively related to the dichotomous and perceived measures of routinization, but not age. Thus, organizational actors believed that district-level support would lead to program longevity, and district-level support facilitated the survival of the program through the various passages and cycles. District-level involvement in decision-making for the program was also positively related to overall support for the program across job levels (i.e., collapsed across principals, teachers, aides, and counselors). Finally, overall staff turnover was negatively related to perceived routinization, suggesting that stable program personnel can lead to perceived program longevity.

Discussion

At this point, several implications of this research can be considered. First of all, it appears that NDN-disseminated programs have been implemented within acceptable bounds of fidelity. These results contrast with much of the implementation literature which suggests that implementation fidelity is difficult and rare (Berman & McLaughlin, 1978; Farrar, DeSanctis and Cohen, 1979). This discrepancy is perhaps due to the following: (1) differences in the specificity of the programs studied, and (2) differences in precision in measuring fidelity. For example, the widely-cited RAND study (Berman and McLaughlin, 1978) examined programs that were loosely defined policy statements rather than well-specified educational programs (Datta, 1981), and measured fidelity as "the extent to which projects met their own goals, different as they might be for each project" (Vol. VII, pg. 50). In the present study, fidelity was

measured as the specific attainment of developer prescribed components. Thus, their implementation measure was biased to reflect adaptation, rather than fidelity. Perhaps, this helps clarify why their major conclusion stated that "mutual adaption" (the changing of both the organization and innovative program to accomodate one another) was the only process that led to successful implementations and viable new programs.

In fact, in a recent article Berman (1980) has advanced the fidelity-adaptation debate considerably by proposing a contingency model of implementation. This contingency model implies that different implementation strategies are most appropiate for different kinds of programs (i.e., broad policy statements vs. explicit, well-specified educational programs). Perhaps, it is the case that highly structured programs demand fidelity-supportive approaches (e.g., intensive training, program monitoring by change agents), whereas unstructured programs imply the use of adaptive strategies (untargeted support fostering localized innovation efforts). Our data support this conceptualization.

The other principal findings of this research were that reinvention and fidelity occured simultaneously in adopting organizations, and that both reinvention and fidelity contributed significantly to program effectiveness. Of course, as described previously, our measurement of reinvention did not necessarily imply lack of fidelity, and included both additions to the program as well as modifications of the component variations. This conceptualization of the term differs from its original use in that: (1) it is independent of fidelity, and (2) it applies to highly specified innovations rather than broad pol-

icy directives (Rice and Rogers, 1979). The broad picture that emerges suggests that some organizations implement programs with high fidelity and add to or "tinker" with the program in such a manner that program effectiveness is enhanced. Both additive reinvention and modification reinvention correlated positively and significantly with effectiveness. It appears that the changes that were made to the program were good ones. It further suggests that the changes that were made were made in the interest of "product efficiency" (Yin, 1977) and not solely due to bureaucratic self-interest or to facilitate ease of implementation.

The implication for the RD&D model is that some mix of program fidelity and program reinvention is optimal for program effectiveness. While, in general, the results suggest that fidelity leads to effectiveness, staff should be allowed the latitude to make positive changes in the program given that these changes appear to contribute to effectiveness. Speculatively, it might be the case that initial high fidelity implementation allows staff to understand the relationship between program activity and program results, and that subsequent changes made in the program are somewhat based upon this understanding. Another possibility is that the reinvention instances occured within the "zone of drastic mutation" (Hall and Loucks, 1978), and thus did not significantly detract from program effectiveness.

Another interesting aspect of the fidelity-adaptation debate concerns the impact of reinvention on routinization. Pro-adaptation proponents suggest that local modification of programs will promote program longevity to the extent that the local modifications

(i.e., reinvention) counter the "not invented here" syndrome and provide implementers with a sense of ownership and investment in the program (Glaser and Backer, 1977). The lack of a strong relationship between routinization and reinvention suggests that this process is not operative. However, fidelity was also unrelated to routinization. All of this suggests that program characteristics per se (i.e., fidelity, reinvention, and effectiveness) do not contribute to program longevity or integration of the program into the organization.

Factors contributing to routinization included staff and administrative support for the program. Specifically, organizational members' involvement in the adoption decision and in initial training and implementation efforts as well as district level support for the program related positively and significantly to routinization. It appears as if supportive organizational members, who were instrumental in bringing the innovative program to the organization, are invested in the program's continuance and integration, and apparently take some successful actions toward that end. These results lend some support to the findings of Berman and McLaughlin (1978) who discovered that little turnover, involvement in decision-making, and administrative support contributed to the continuation of programs whose federal "seed" money had terminated.

Finally, the lack of agreement among different measures of routinization implies that program continuance (survival over time) and program integration (incorporation as stanard operating procedure) are independent phenomenea. If the passages and cycles do indeed measure program integration, and the perceived routinization does

indeed measure program continuance, then the results of this study indicate continuance and integration are unrelated. It is possible that a highly integrated program can be terminated due to the disappearance of organizational slack, severe organizational budget reductions across the board, or the alleviation of performance gaps, all independent of the program's impact on or integration into the organization. Although personnel related issues, such as turnover, did relate to routinization, other factors hypothesized in the literature, such as budget issues and program governance, did not. Probably the ideal way to disentangle program continuance and integration of the program into the organization, as well as to explicate further the relationships among the other concepts in this study, would be to conduct longitudinal investigations. It is hoped that the findings of this study will provide impetus for such future studies.

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Table 1

Innovative Social Programs Selected for Study

Education

1. HOSTS (Help One Student to Succeed)--A diagnostic, prescriptive, tutorial reading program for children in grades 2-6. Tutors are community volunteers and cross-age students. The program includes "pulling out" students from their regular classes at least one-half hour per day.

2. EBCE (Experience Based Career Education)--This program provides career experience outside of school at volunteer field sites for the student. Each career site is systematically analyzed for its educational potential. Students' career and academic abilities and interests are systematically assessed. Individualized learning plans which integrate career experiences and academic learning are utilized. Programs typically take students from grades 11-12, although some also accept students from 9-10.

3. FOCUS (Focus Dissemination Project)--A "school within a school" for disaffected junior and senior high school students. All students are required to participate in a support/problem solving group of 8-10 students and one teacher. Behavioral contracting and a governing board with student representatives are important features. Classes in the Focus program involve individualized, self-paced instruction.

Table 2

Yin's Passages and Cycles

1.	Survives equipment turnover	(cycle)
2.	Innovation support changes from soft to hard money (Transition to support by local funds)	(cycle)
3.	Establishment of appropriate organizational status	(passage)
4.	Supply and maintenance provided by agency or on long-term (contract) basis	(passage)
5.	Functions become part of job descriptions or prerequisites (Establishment of personnel classifications or certification)	(passage)
6.	Use of innovation becomes part of statute, regulation, manual, etc. (Changes in organizational governance)	(passage)
7.	Skills become part of professional standards, professional school curriculum (Internalization of training program)	(passage)
8.	Survives promotion of key personnel (personnel acquainted with the innovation)	(cycle)
9.	Survives introduction of new personnel (Turnover in key personnel)	(cycle)
10.	Attainment of widespread use	(cycle)
11.	Stabilization of Budget Cycles	(cycle)
12.	Skills taught during many training cycles	(cycle)

Note: The labels in parentheses are alternative descriptions used by Yin.

Table 3

Relationships Among Major Variables

	Fidelity	Reinvention	Effectiveness	Routinization (perceived)	Routinization (P&C-based)
Fidelity	(.81)				
Reinvention	.3890*	(.82)			
Effectiveness	.3917*	.4707**	(.90)		
Routinization (perceived)	.0624	.1484	.1642	(.82)	
Routinization (P&C-based)	.1116	-.1078	-.0760	-.0385	(--)

* = $p < .05$

** = $p < .01$

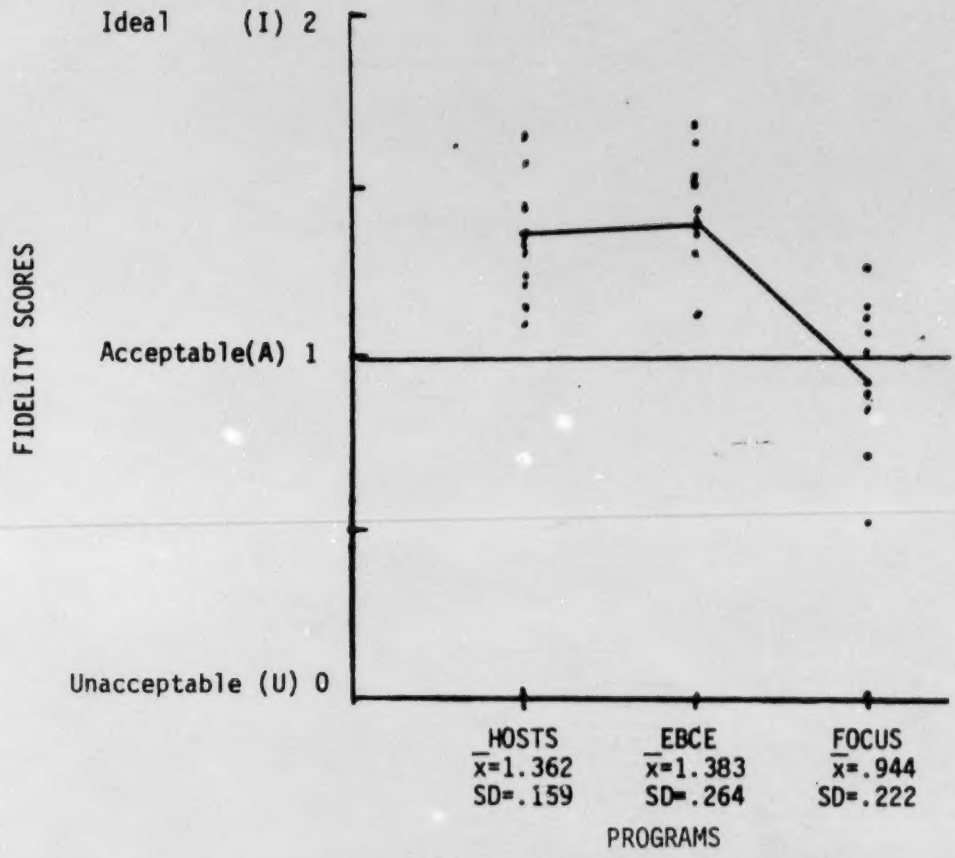
Figure 1

Conceptualization of Reinvention

	Addition	Modification
Proactive		
Internal Reactive		
External Reactive		

Figure 2

Frequency Distributions of Fidelity Scores



Appendix 1

Materials

Adequate supply of HOSTS recommended materials.
I Resource room has sufficient materials to meet all skill levels.
A Resource room has nearly all the materials necessary to meet demands at all skill levels.
U Resource room has less than a sufficient amount of materials to meet all the skill levels.

Cross referencing system is in use.
I The cross referencing system is in full operation and used as a process to link reading deficiencies to existing published materials designed to train students in those deficiencies.
U The cross referencing system is not in operation as a link between deficiencies and materials.

Cross referencing index in use is HOSTS index.
I The cross referencing index is the HOSTS index designed to identify materials by publisher, reading title, skill level, etc.
U There is a cross referencing index in use but it is not the official HOSTS cross referencing manual.

The skills, materials and games are cross referenced.
I Greater than ninety percent of the skills, material and games are coded by reading level and cross referenced.
A Between seventy-five and ninety percent of the skills, material and games are coded by reading level and cross referenced.
U Less than seventy-five percent of the skills, material and games are coded by reading level and indexed.

The self-selection reading material is color coded and made accessible.
I Greater than ninety percent of the self-selection reading material is color coded by reading level.
A Between seventy-five and ninety percent of the self-selection reading material is color coded by reading level.
U Less than seventy-five percent of the self-selection reading material is color coded by reading level.

Task analysis is used to incorporate new materials.
I Reading instructors perform task analysis in order to further expand the HOSTS cross referencing index. (Task analysis asks the following questions: Does the material teach a precise skill? Is there anything confusing about the material? Is there enough to reinforce and teach the skill? What is the particular reading level of that material?) New, task analyzed material is forwarded to HOSTS.
A Reading teachers are trained to recognize new material and add it to their cross referencing system for future use AND/OR refer it to HOSTS for formal inclusion in updated versions of the cross referencing manual. BUT do not perform all the task analysis steps.
U Reading instructors are not trained and don't perform task analysis.

Facilities/Equipment

Resource room is available.
I A separate room is available for the HOSTS program.
U A separate room is not available for the HOSTS program.

Resource room is near regular class room.
I The resource room is located in close proximity to the regular class room.
U The resource room is not located in close proximity to the regular class room.

Resource room is of sufficient size.
I Resource room is of sufficient size to comfortably accommodate students and tutors.
U Resource room is not of sufficient size to comfortably accommodate students and tutors.

Resource room has adequate storage.
I Resource room has adequate storage capabilities to hold the HOSTS materials.
U Resource room does not have adequate storage capabilities to hold the HOSTS materials.

Buses used to transport student tutors.
I Buses are available to bring high school student tutors to the grade school.
A Some other form of transportation is available to bring students to the grade schools.
U No system to provide transportation for potential high school student tutors is available.